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## Vaginal cuff dehiscence: Risk factors and management

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### Abstract

Vaginal cuff dehiscence and evisceration are rare but serious complications of pelvic surgery, specifically hysterectomy. The data on risks of vaginal cuff dehiscence are variable and there is no consensus on how to manage this complication. In our review, we present a summary of the risk factors, presenting symptoms, precipitating events, and management options for patients who present with vaginal cuff dehiscence after pelvic surgery. In addition, we provide a review of the current literature on this important surgical outcome and suggestions for future research on the incidence and prevention of vaginal cuff dehiscence.

### Keywords

dehiscence; evisceration; vaginal cuff

### Background and Introduction

Hysterectomy is the most frequently performed major gynecologic surgical procedure. (1) Between 2000 and 2004, 3.1 million hysterectomies were performed in the United States. (2) Vaginal cuff dehiscence and vaginal evisceration, though rare, are serious post-operative complications after hysterectomy or other pelvic surgery. Because the data on risks of vaginal cuff dehiscence are variable and there is no consensus on how to manage this complication, we performed a review of original research, case reports, and case series published in the past 30 years on vaginal cuff dehiscence. In this review, we present a summary of the published evidence, risk factors, presenting symptoms, precipitating events, and management options for patients who present with vaginal cuff dehiscence after pelvic surgery.

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## Limited body of evidence

Although vaginal cuff dehiscence is a serious complication for both the patient and provider, its low incidence makes it difficult to study. In reviewing the literature, we identified only 44 pertinent publications on vaginal cuff dehiscence, 68% (30/44) of which were case reports involving two or fewer patients.(3-32) Overwhelmingly, the published information on vaginal cuff dehiscence consists of case reports, which are inherently problematic because of selection bias; physicians tend to write up interesting or unusual cases for publication and because the denominator is unknown, it is not possible to estimate rates. Of the remaining studies which informed this review, three were case series (three or more patients) (33-35), four were “descriptive studies” (reviewing all hysterectomies performed at an institution over a certain time period and specifically detailing vaginal cuff dehiscence) (36-39), two were retrospective cohort studies (40-42), one was a randomized clinical trial (43), and three were expert opinion articles that contained some discussion of vaginal cuff dehiscence (44-46). A summary of the case reports, case series, and descriptive studies are presented in table 1.

## The incidence and timing of vaginal cuff dehiscence and evisceration

The exact incidence of vaginal cuff dehiscence is difficult to determine because the definition and the incidence varies from study to study. The rate of vaginal dehiscence ranges from 0.14% to 4.1% (36, 39), with studies including only robotic hysterectomy and total laparoscopic hysterectomy (TLH) reporting higher incidence rates (1%-4.1%) (39, 40) than studies including all types of hysterectomy (0.14%-0.27%) (36,38). Similarly, the rates of vaginal evisceration vary based on the surgical approach and range from 0.032% to 1.2%. (37, 39)

Vaginal cuff dehiscence can occur at any time after a pelvic surgical procedure and has been reported as early as 3 days (34) and as late as 30 years postoperatively (18). In retrospective cohort studies and larger case series the mean time to cuff dehiscence varied between 6.1 weeks up to 1.6 years (range 2 weeks to 5.4 years), though this may differ by mode of hysterectomy. One study which combined case reports from individual surgeons participating in an online “list-server” and published case reports found that the mean time to cuff dehiscence was seven weeks for patients who had a TLH compared to 13 weeks for patients who had a TAH (p=0.01).(33) However, definitive conclusions about mean time to cuff dehiscence cannot be made based on results of individual case reports.

## Risk factors for vaginal cuff dehiscence

### Mode of hysterectomy

Vaginal cuff dehiscence and vaginal evisceration have complicated gynecologic surgery long before the advent of laparoscopic and robotic approaches to hysterectomy. In older reviews of vaginal evisceration, the majority of cases reported in the literature had occurred after vaginal hysterectomy (63%).(44) However, the distribution of reported cases has changed significantly over the past 5 years; Currently 50% of the cases reported in the literature occurred after total laparoscopic hysterectomy or robotic hysterectomy. There are many explanations for this shift including increased interest in minimally invasive surgery leading to increased publication of individual case reports, increased publications on institutional outcomes of minimally invasive hysterectomy, and the possibility that the laparoscopic and robotic approaches are associated with increased risk of vaginal cuff dehiscence.

Older studies, which included no or very few patients who had either a total laparoscopic or robotic hysterectomy, found a very low incidence of vaginal dehiscence and evisceration (0.2% and 0.032%, respectively) (37, 38). In a review of all hysterectomies performed at single institution over a 6 year period, Hur et al. found that the incidence of vaginal dehiscence increased from 0% to 0.7% between 2000 and 2006. (36) These increased rates of dehiscence may be related to increased utilization of minimally invasive hysterectomy techniques. Studies have reported rates of 1.1%-4.9% (36, 40) for cuff dehiscence after TLH and 3% after robotic hysterectomy (40) compared to rates of 0.29% and 0.12% after TVH and TAH, respectively. (40) One study showed that patients undergoing TLH have 21 times and 53.2 times the risk of having a vaginal cuff dehiscence compared to patients who had a TVH or TAH, respectively. (36) The relationship between cuff dehiscence and mode of hysterectomy would be best assessed by a very large RCT study design. Though RCTs have compared outcomes of different hysterectomy approaches, these studies are not large enough to determine a clinically meaningful difference in cuff dehiscence given the rarity of this outcome. In the absence of such RCTs, the limited data available from case series and cohort studies suggest the possibility of higher incidence of vaginal dehiscence after TLH or robotic hysterectomy than after TAH or TVH. (36, 39, 40) Over time, as minimally invasive hysterectomy techniques improve and become more streamlined, we will see whether this trend of increased cuff dehiscence is maintained.

Different methods for vaginal cuff incision and closure at the time of TLH or robotic hysterectomy may alter the risk of vaginal cuff dehiscence. Since studies have pointed to the possibility of increased risk of dehiscence with minimally invasive techniques, it is important to take into account some potential differences in surgical technique that could contribute to this problem. Different from TVH and TAH, for TLHs, electrocautery is sometimes used for colpotomy, different suturing techniques are used, and a more magnified visualization of the surgical field could inadvertently lead to smaller purchases on tissue being sutured. Specific surgical techniques, including the use of monopolar current on cutting mode (a continuous, low-voltage current which leads to less thermal spread compared to coagulation mode) to incise the cuff, achieving cuff hemostasis with sutures rather than electrocoagulation, using a two layer cuff closure with polydioxone suture, ensuring adequate tissue edges when suturing the vaginal cuff closed, and bidirectional barbed suture for cuff closure, have all been suggested to decrease the risk of cuff dehiscence after TLH or robotic hysterectomy. (39, 42) Although one small RCT comparing interrupted figure of eight closure with a 2 layer running closure of the vaginal cuff during TLH found no difference in cuff dehiscence between groups, it was likely underpowered to detect a clinically meaningful difference (43). Using bidirectional barbed suture for cuff closure has been shown to significantly decrease the rate of vaginal cuff dehiscence over other methods of closure (0% vs. 4.2%,  $p=0.008$ ) while not increasing the rate of postoperative bleeding, cuff cellulitis, or granulation tissue. (42) This study, however was a retrospective review examining the outcomes during the first year of use of bidirectional barbed suture compared to conventional cuff closure. It is possible that while learning to use this new suture material and technique, closer attention was paid to ensuring adequate bites of healthy tissue when suturing which could have further contributed to their positive results. Further research on the impact of these surgical techniques is necessary to determine whether or not they alter the rate of vaginal cuff dehiscence.

### Other risk factors

Increased age, increased number of vaginal surgeries, vaginal atrophy, factors associated with poor wound healing (including malignancy, chronic steroid use, malnutrition, tissue radiation), increased valsalva (chronic cough), and postoperative vaginal cuff infection or hematoma may be risk factors for vaginal cuff dehiscence. (44) Based on case reports and

institutional case series, the mean age of patients experiencing a cuff dehiscence is 48.3 years, which is similar to the average age of patients undergoing hysterectomy in the United States (46 years). (2, 47) Though some studies have reported that most of their patients with dehiscence were post-menopausal (37), others have reported that most of their patients with dehiscence were pre-menopausal. (36)

Data on additional risk factors for cuff dehiscence are limited and conflicting. Though one study reported no difference in age, tobacco use, or diabetes between women with and without cuff dehiscence, it was likely underpowered to detect a clinically meaningful difference. (40) Though it seems biologically plausible that any condition that could compromise wound healing would increase the risk of vaginal cuff dehiscence, the data on such risk factors are sparse. The inconsistency of reporting of risk factors in studies and case reports, rarity of the vaginal cuff dehiscence, and the lack of comparison of risk factors between women with and without dehiscence in most retrospective studies makes it impossible to assess the significance of each of these potential risk factors.

## Clinical Presentation and Precipitating Events

Patients with vaginal cuff dehiscence can present with a combination of several different symptoms, most commonly pelvic or abdominal pain (58-100%), vaginal bleeding or watery discharge (33%-90%). Although one study reported two asymptomatic patients with a cuff dehiscence (in a series of 21 patients) who were diagnosed at a routine post-operative appointment, most patients with cuff dehiscence present for medical care within 24 hours of the onset of symptoms. (39) Patients with evisceration of bowel or intra-abdominal contents into the vagina often describe feeling a mass or pressure. Evisceration occurs in up to 70% of vaginal cuff dehiscence cases. (38)

Although intercourse, straining with defecation, or valsalva can precede postoperative dehiscence of the vaginal cuff, many women who experience vaginal cuff dehiscence have no identifiable precipitating event. In the cases of vaginal cuff dehiscence reported in the literature, 8%-48% reported intercourse and 16%-30% reported defecation or valsalva (cough or sneeze) as the precipitating event. However, spontaneous vaginal cuff dehiscence has been reported to represent up to 70% of cases. (37, 40) Therefore, a high index of suspicion should be maintained for patients presenting after hysterectomy with sudden onset pelvic or abdominal pain accompanied by vaginal bleeding or watery discharge.

## Methods of repair

Currently, there is no consensus on the ideal method of surgical repair after vaginal cuff dehiscence or evisceration. In the case reports, case series, and retrospective cohort we reviewed, 51% of dehiscences were repaired vaginally, 32% were repaired abdominally, 2% were repaired laparoscopically (n=3), 10% were repaired with a combined (abdominal and vaginal or laparoscopic and vaginal) approach (n=6), and 5% were allowed to heal by secondary intention (n=7). Of 73 dehiscence repairs reported across case series and retrospective cohort studies, only three (4%) experienced another dehiscence requiring a second repair. Although many individual case reports in the literature detail repeat cuff dehiscence, this may represent the fact that physicians are much more likely to submit case reports of unusual or repeated complications.

The current evidence available on approach (vaginal, abdominal, laparoscopic) to repair of a vaginal cuff dehiscence does not suggest that one approach is preferred over the others. Many factors affect choice of surgical repair including the clinical stability of the patient, surgeon experience, level of suspicion for damage to intra-abdominal organs, whether or not a bowel evisceration is present, ability to evaluate the bowel for ischemia or damage, ability

to visualize and re-approximate vaginal mucosa adequately, and ability to perform additional necessary procedures. Because no one method is superior to another, method of closure is decided by the surgeon based on which closure he or she thinks will allow the best tissue approximation, strength of repair, and ability to assess for additional problems (bowel).

## Conclusions

Vaginal cuff dehiscence and evisceration are serious complications of pelvic surgery, specifically hysterectomy. Though the data are limited, minimally invasive approaches to hysterectomy, such as TLH and robotic hysterectomy may be associated with higher risk of vaginal cuff dehiscence. The American Congress of Obstetricians and Gynecologists recently emphasized that total vaginal hysterectomy should remain the primary approach to hysterectomy when feasible. (48) Despite these recommendations, TLH and robotic hysterectomy are becoming increasingly common. Because of the possible increased risk of vaginal cuff dehiscence with TLH and robotic hysterectomy, we suggest that gynecologic surgeons may want to discuss this complication with patients and provide them with information about possible symptoms of post-operative cuff dehiscence (pelvic pressure, sudden fluid leaking from the vagina, vaginal bleeding, or pelvic pain). Though judicious use of electrocautery at the vaginal cuff and utilization of two layer cuff closure or bidirectional barbed suture may potentially decrease the risk of cuff dehiscence, the extent of the effect that these surgical techniques have on reducing the incidence of dehiscence is uncertain. Continuing to identify and definitively investigate surgical techniques that may decrease the risk of cuff dehiscence is paramount.

There is no one standard method to managing vaginal cuff dehiscence; the cases reported in the literature illustrate that vaginal, laparoscopic, abdominal, and combined approaches are all appropriate methods for secondary cuff closure. Each patient and each cuff dehiscence is different and the surgical approach should be dictated by the clinical circumstances and surgeon's judgment as to which approach will allow assessment for other problems (examination of the bowel, when there is concern about compromise) and allow optimal tissue approximation.

Unfortunately, much of what we know about vaginal cuff dehiscence comes from case reports and case series, making it difficult to truly assess possible risk factors and whether or not these risk factors differ by type of surgical procedure, mode of hysterectomy, or age. More research is necessary to identify modifiable risk factors for vaginal cuff dehiscence and methods for its prevention. Development of national reporting system or registries for surgical outcomes would facilitate the investigation of this rare complication and other important surgical complications. A multi-institutional prospective study examining hysterectomy outcomes would be the ideal way to determine true rates and identifiable risk factors for vaginal cuff dehiscence across a multitude of surgical techniques and modalities. This type of study, however, would be quite costly and time-consuming because of the rarity of the outcome, vaginal cuff dehiscence. Given the limited data on vaginal cuff dehiscence, we would recommend that institutions continue to publish their data on surgical outcomes and consider combining their data on cuff dehiscence with other institutions in order to better evaluate different hysterectomy approaches and specific surgical techniques during hysterectomy. Vaginal cuff dehiscence is a serious complication of hysterectomy and pelvic surgery and warrants additional research into its prevention and optimal management.

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**Table 1**  
**Description of case series and cohort studies on vaginal cuff dehiscence**

Study Author and year Brief description	Incidence	Mean age in years	Type of pelvic surgery	Mean interval to dehiscence	Proportion with evisceration	Method of closure
Croak 2004 Description of all vaginal eviscerations at a single institution between 1970-2001	0.032% (denominator not given)	63	42% TAH 33% TVH 25% other/trauma	2.25 years (5 months-4 years)	50%	8% abdominal 58% vaginal 25% vaginal/abdominal combination 8% vaginal/laparoscopic combination
Iaco 2006 Description of all vaginal dehiscences after hysterectomy at a single institution between 1995-2001	0.27% (10/3593)	57.5	60% TAH 30% TVH 10% TLH	1.6 years (2 months to 5.4 years)	70%	100% abdominal
Hur 2007 Description of all vaginal dehiscences at a single institution between 2000-2006	0.14% (10/7286)	39.9	10% TAH 10% TVH 80% TLH	2.75 months (1 months to 1 year 3 months)	60%	90% vaginal 10% vaginal/abdominal combination (to allow concomitant pelvic organ prolapse procedures)
Agdi 2009 Series of 16 cases of vaginal cuff dehiscence reported via AAGL list-server and literature review	NA	44	6% TAH 94% TLH	3 weeks (3-6.5 weeks)	NA	NA
Kho 2009 Description of all vaginal dehiscences after robotic hysterectomy at a single institution between 2004-2008	4.1% (21/510)	45	Robotic hysterectomy, vagnectomy, or trachelectomy	1.5 months (2 weeks to 4.5 months)	29%	90% vaginal 5% vaginal/laparoscopic combination 5% secondary intention
Nick 2011 Retrospective cohort study of TLH and robotic hysterectomy between 2000-2009	1.7% (7/417)	30	All TLH and robotic	4.3 months (1.9 months to 5.8 months)	43%	43% vaginal 57% secondary intention
<b>Multiple authors</b> Summary of 32 case reports and series (26 with one patient, 4 with 2 patients, 2 with 3 patients)	NA	58.8	35% TAH 45% TVH/LAVH 15% TLH/robotic 2% other	3.93 years (3 days to 30 years)	***%	52.5% abdominal 32.5% vaginal 5% laparoscopic 10% vaginal/laparoscopic combination

NA – Not available; TAH – Total abdominal hysterectomy; TVH - total vaginal hysterectomy; TLH – total laparoscopic hysterectomy; LAVH – laparoscopically-assisted vaginal hysterectomy

**Table 2**  
**Summary of data from case reports, case series, and cohort studies on vaginal cuff dehiscence: Type of surgery preceding the cuff dehiscence and management of cuff dehiscence**

	N (%)
<b>Type of surgery*</b>	
Total abdominal hysterectomy	27 (23)
Vaginal hysterectomy or LAVH	26 (22)
Total laparoscopic hysterectomy	58 (50)
Other pelvic surgery	5 (4)
<b>Management of dehiscence<sup>‡</sup></b>	
Laparotomy and repair	32 (32)
Vaginal repair	51 (51)
Laparoscopic repair	2 (2)
Vaginal plus laparotomy	4 (4)
Vaginal plus laparoscopy	6 (6)
Secondary intention/expectant management	5 (5)

\* Includes a total of 116 cases of reported cuff dehiscence reviewed.

<sup>‡</sup> Includes a total of 100 cases where the management of cuff dehiscence was reported.

One study with 16 cases did not report management